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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/617,858	07/17/2000	Marie B. O'Regan	UA0026 US NA	8333

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E I DU PONT DE NEMOURS AND COMPANY
LEGAL PATENT RECORDS CENTER
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EXAMINER
LOUIE, WAI SING

ART UNIT	PAPER NUMBER
2814	

DATE MAILED: 12/11/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/617,858	O REGAN ET AL.	
	Examiner	Art Unit	
	Wai-Sing Louie	2814	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *amendment filed on 10/9/02* .

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-10 and 12-24* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-10 and 12-24* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

DETAILED ACTION

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 1-10, 12-18, and 20-23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Celii et al. (US 6,274,979) in view of Lu et al. (US 5,764,324) and Pichler (WO 98/10621).

With regard to claims 1-2, 13, and 18, Celii et al. discloses an organic light-emitting device (col. 2, line 35 to col. 4, line 60 and fig. 11) comprising:

- An anode comprising a semi-transparent layer made of ITO (fig. 11), but Celii et al. do not disclose the transparent electrode layer having a high work function. However, Lu et al. disclose ITO has the work function of 4.7 eV (Lu col. 5, line 56). Therefore, the transparent electrode, ITO is a high work function layer. Celii et al. disclose a dielectric layer as a reflector, but do not disclose the layer has a reflectivity of at least 86%. However, Lu et al. disclose inserting a reflecting silver layer 32 underneath the ITO layer 52 (Lu fig. 5). Lu et al. teach the reflective layer controls the amount of light transmitted and the amount of voltage supplied (Lu col. 5, lines 1-9). That means a highly reflective layer could save the voltage applied to the device. Therefore, it would have been obvious to one with ordinary skill in the art to modify Celii's device with the teaching of Lu et al. to

provide a highly reflective metal layer in order to save operating voltage. The metal reflective layer is a total reflector and has more than 86% reflectivity;

- A cathode comprising an aluminum layer (fig. 11), but do not disclose a second cathode layer. However, Pichler teaches the OLED often necessary to employ cathode material with low work function to achieve efficient electron injection and low operating voltages (Pichler p.1 and 2) and the low work function cathode layer is then covered with a thick conductive cathode layer having high conductivity and provides an environmental protection to the low work function cathode layer (Pichler p. 4). Pichler discloses the second cathode layer 5 is made of aluminum (Pichler p.6). Therefore, it would have been obvious to one with ordinary skill in the art to modify Celii's device with the teaching of Pichler to provide a second cathode layer in order to protect the low work function first cathode layer;
- Celii et al. disclose an organic laser device with a pair of parallel reflectors having a high reflectivity of 0.9. The device is a metal etalon microcavity structure.

With regard to claims 3 and 12, Celii et al. do not disclose the semi-transparent layer includes an anode material selected from metal and metal alloys. However, it is common in the art to used thin metal layer such as gold or silver as a semi-transparent or transparent electrode. Therefore, it is obvious to provide a semi-transparent metal and metal alloy anode in order to transmit light through the layer.

With regard to claims 4 and 5, Celii et al. do not disclose the cathode layer made of aluminum has a work function of greater than 4 eV. However, Lu et al. disclose the work function of aluminum is from 4.06 to 4.41 eV (Lu col. 5, line 55).

With regard to claims 6-10, 14-17, and 20-23, Celii et al. disclose the semi-transparent layer has a dielectric reflector. Celii et al. do not disclose how high is the reflectivity at the wavelength of emission or how thick is the layer. However, The temperature, power, time, thickness and reflectivity are considered to involve routine optimization, which has been held to be within the level of ordinary skill in the art. As noted in In re Aller, the selection of reaction parameters such as temperature and concentration, thickness etc. would have been obvious:

> "Normally, it is to be expected that a change in temperature, or in thickness, or in time, would be an unpatentable modification. Under some circumstances, however, changes such as these may impart patentability to a process if the particular ranges claimed produce a new and unexpected result which is different in kind and not merely degree from the results of the prior art...such ranges are termed "critical ranges and the applicant has the burden of proving such criticality.... More particularly, where the general conditions of a claim are disclosed in the prior art, it is not inventive to discover the optimum or workable ranges by routine experimentation."
>
> *In re Aller 105 USPQ233, 255 (CCPA 1955). See also In re Waite 77 USPQ 586 (CCPA 1948); In re Scherl 70 USPQ 204 (CCPA 1946); In re Irmscher 66 USPQ 314 (CCPA 1945); In re Norman 66 USPQ 308 (CCPA 1945); In re Swenson 56 USPQ 372 (CCPA 1942); In re Sola 25 USPQ 433 (CCPA 1935); In re Dreyfus 24 USPQ 52 (CCPA 1934).*

Therefore, one of ordinary skill in the requisite art at the time the invention was made would have used any temperature, power, time, thickness, and reflectivity suitable to the method in process in order to optimize the design.

Claims 19 and 24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Celii et al. (US 6,274,979) modified by Pichler (WO 98/10621) as applied to claim 1 above, and further in view of Gu et al. (US 5,844,363).

With regard to claims 19 and 24, Celii et al. modified by Pichler disclose:

- The semi-transparent ITO layer has a first surface adjacent to the cathode and an opposite second surface;
- Celii et al. do not disclose the anode further comprising a passivation layer adjacent to the first surface. However, Gu et al. disclose the passivation layer selected from polyaniline (col. 6, lines 39-47). Gu et al. teach the organic passivation layer can be used as a hole-injection layer. Therefore, it would have been obvious to one with ordinary skill in the art to modify Celli's device with the teaching of Gu et al. to provide a polyaniline layer. Doing so a hole-injection layer is provided.

Response to Arguments

Applicant's arguments filed 3/18/02 have been fully considered but they are not persuasive.

- Applicant argues that Celii et al. do not disclose a metal etalon microcavity structure. From the "Complete Guide to Semiconductor Device" by Kwok Ng, 1995 Ed., an etalon laser device is also called a Fabry-Perot resonator, which has two parallel mirror surfaces having high reflectivity of around 0.9 (page 60-61).

Celii et al. disclose two reflective surfaces, which is the dielectric reflector and the aluminum cathode. Therefore, Celii et al. disclose an etalon structure.

- Applicant argues that Celii et al. do not disclose a reflector having a reflectivity of at least 86%. However, Celii et al., modified by Lu et al. in claim 1, would disclose a metal reflector of silver, which has a high work function of 4.74 eV and it is a total reflector (Lu col. 5, lines 50-51).

Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Wai-Sing Louie whose telephone number is (703) 305-0474. The examiner can normally be reached on 7:30 AM to 4:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Wael Fahmy can be reached on (703) 308-4918. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 308-7722 for regular communications and (703) 308-7722 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.

wsl
December 5, 2002

SUPERVISORY PRIMARY EXAMINER
TECHNOLOGY CENTER 2800